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No. XI.

SECRET LOCK.

The sum of TEN GUINEAS was this session presented to Mr. WALTER FRIEND, Earl-street, Clifton-street, Finsbury, for a Secret Lock; a model of which has been placed in the Society's repository.

No. 25, Earl-street, Clifton-street,
Finsbury-square.

SIR,

I SUPPOSE almost every lock hitherto made has a key, and if a key be made exactly similar to the proper one, (let the lock be patent or not), it will of course open the lock. The various methods that have been resorted to for procuring false keys, and are still practised every day, are but too well known.

To obviate the frauds and speculation hence arising, I offer the accompanying model of a lock for the approbation of the Society of Arts, the opening and shutting of which is peculiar, and at the same time simple.

Keys or picklocks are of no use in opening it. The key which belongs to it is of no use to any person without the guide, which is so portable as to be put into a pocket-book, &c. and can be varied in such a manner in a few seconds, by such an indefinite number of movements, as to put it out of the power of any person to open it, even if he is in possession of *the guide*, unless he is acquainted with the numbers to which it is set. This renders it safe, strong, compact, and secure. To open the lock you will

observe on *the guide* two circles, with the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, on each, and the stops are now set at 2, 6. Put on the guide to the front of the lock, with the number 1 upward toward the bolt, so that the stops go into the grooves in the plugs; introduce the key, and turn it round, until you can take it out again,—*you will find the lock open*. Now, if you take off the guide, it cannot be shut or locked so as to take out the key; because every time the key comes to be taken out it is open. To shut the lock, put on the guide, and turn the key any part of the way round; then take off the guide,—you will find it shut and secure. You may turn the key as often as you please without any effect.

The advantages which I conceive my lock possesses are

1. That it cannot be picked.
2. That a fac-simile key cannot unlock it.
3. That the true key cannot unlock it without the guide.
4. That even with the true key and the guide in the hands of strangers, the lock is secure, unless the secret of the numbers set to the lock, be known.

I am, Sir,

A. Aikin, Esq.

Secretary, &c. &c.

&c. &c. &c.

WALTER FRIEND, Jun.

Reference to the Engraving of Mr. W. Friend's Lock.

Plate VII. Figs. 1 and 2 are back views of the lock, the plate being removed, A the bolt, it has two arms with studs *b b* projecting forwards, and a point *c*, which form three bearings or supports, all or either of which are

sufficient to keep the bolt out; $d d$ a spring, the action of which is to withdraw the bolt, $e e$ two similar plates with notches to receive the studs $b b$. f a third plate with a notch to receive the point c . In fig. 1 the notches of all the three plates coincide with the studs, the obstacles to the action of the spring d therefore are withdrawn, and the bolt retracts; fig. 3 shows the front of the lock: when the key is introduced and turned, it moves the plate f , fig. 1, and thus, by raising the point c out of the notch, it protrudes the bolt, and as the three plates are connected together by three toothed wheels, shown in fig. 4, they all move and keep the bolt protruded, but when the key is turned quite round to withdraw it, the plates again agree with the studs, and the bolt is withdrawn or unlocked; the notch in the middle plate f always agrees with the point c when the key is withdrawn, therefore to leave it locked, it is requisite to derange the three plates, as shown in fig. 2. This is effected by the peculiar construction of the axis s , which carries the plates $e e$: one of them is shown with all the parts separated in fig. 5, g the axis (the bottom face of which is seen in g , fig. 3, showing a groove nearly all round it in which is fixed an upright pin h , figs. 6 and 7); i the toothed wheel which first goes on the axis g ; j a strong spring nut which follows it, and is pinned on so as to hold the wheel very tight, and yet allow it to move alone by applying additional force; over this goes the bar $l l$, figs. 1, 2, and 4, the holes of which are large enough for the nuts j to project through; over this is lastly put on the notched plate e , which fits on the axis g , and is screwed tight against the nut j by the screw m , which enters the end of the axis g . In fig. 2 the screws are removed to show the plates $e e$, and

the end of axis *g*. Now in order to prevent each of these plates from turning without its axis *s*, there are ten holes round the center hole, shown in fig. 8, and a pin *k*, fig. 5, is fixed on one side of the top of the nut *j*, which enters one of these holes and secures it. Fig. 9 shows the middle toothed wheel and notched plate *f*, with the axis *o* separate: they are all screwed together by the side screw: fig. 10 shows the front of the axis, with the notch to receive the projection *n* of the key, fig. 11; *o*, fig. 9, is the end which enters the key. Having described the wheels and their axis, it remains to describe the governor or secret guide plate which, with the key, either arranges or disarranges the plates. Fig 6, the guide plate; fig. 7, a section, with the parts separated; it has an octagonal hole which fits on the octagonal projection round the key hole in fig. 3: on each side and within the circles of numbers are moveable circular plates *r r*, having ten holes round their circumference corresponding to the 10 numbers: *p p* a spring which screws against the edge of the plate by the screws *s s*, but is separated here to show the pins *q q*, each of which, passing through the edge, enters one of the ten holes in the moveable plates *r r*, and secures them from turning round; by which means the stops or guide pins *h h* are fixed at any chosen number, here they are at 6 and 3. Now when this guide plate is put on the face of the lock, as shown by the dotted lines *t t*, fig. 3, the pins *h h* enter the grooves round the face of the axis *g*, and it will be seen that the stops or ends of the grooves correspond with the stopping pins *h*; then, on turning the key any portion round, the middle plate *f* turns and protrudes the bolt, while the two side plates *e e* are prevented from turning by the pins *h h* in the grooves

g g, their respective toothed wheels only turning: then, on removing the plate and continuing to turn the key, they will all three move and appear as in fig. 2, all supporting the bolt, as they disagree: by continuing to turn the key, the bolt can never be withdrawn, though when the key is taken out, the side plates only support the bolt. Then to unlock it, put the guide plate on again and turn the key, all the three notched plates will now move till the end of the grooves *g g*, fig. 3, come in contact with the stopping pins *h h* which detain the side plates *e e* in their right places as fig. 1; and continuing to turn the key till it will come out, the middle plate also agrees, and the bolt is thrown down by the spring *d*. If it be required to alter the secret, raise up the spring *p*, fig. 6, withdraw the pins *q q*, then turn the plates *r r* till the pins *h h* coincide with the intended numbers, and the pins *q q* will fix them; then put it on the face of the lock, introduce the key, and turn it quite round, and take it out again, the stops will then have detained the axis *g g* at the right places: then open the back of the lock, withdraw the screws *m m*, lift up the notch plates *e e*, which will be found in some such position as in fig. 2 (but the middle plate, when the key is out, is always found as in fig. 1) and place them on again as fig. 1, the ten holes round their centers allow ten changes of position in each, screw them fast, and finally shut up the lock: if either one or both the moveable guide plates *r r* be altered the lock cannot then be opened; they must be returned to the right numbers which you keep secret before it can be opened. In fig. 2 the tail of the bolt is broken away to show the under parts. Fig. 12 a side view of the bolt.